

REMARKS

Claims 1-2 and 4-15 are now present in this application. Claims 1 and 8 are independent claims. Claims 1, 2, 4, 5 and 8 have been amended.

Reconsideration of the application, as amended, is respectfully requested.

REJECTIONS UNDER 35 U.S.C. § 112

Claims 1-2 and 4-15 stand rejected under 35 U.S.C. 112, first paragraph because the added limitation "symmetrical" and "symmetrical halo implants" could not be found in the original specification.

To overcome the Examiner's rejection, Applicants have deleted the limitation "symmetrical" and "symmetrical halo implants" from the claims. Reconsideration and withdrawal of this rejection are respectfully requested.

REJECTIONS UNDER 35 U.S.C. § 102

Claims 1-2 and 4-15 stand rejected under 35 U.S.C. § 102 (a) as being unpatentable over U.S. Pat. No. 6,372,587 to Cheek et al. (Cheek). This rejection is respectfully traversed.

The Examiner asserts that Cheek discloses performing first and second halo implant processes on the first conductive type MOS region at twist angles of about 0° and 180° respectively, and cites col.2, line 66 to col.3, line 3 of

Cheek. Applicants respectfully submit that this portion of Cheek refers to an isolated feature in a conventional art method (Fig.3), and cannot be combined with the features of the Cheek patent (shown in Figs. 5 and 6) to sustain a rejection of claims under 35 U.S.C. 102(a). Therefore, the rejection using this combination is not valid. ✓

Further, in the method of Cheek, two (and only two) halo implants are performed, namely, the first halo implant shown in Fig. 5 and the second halo implant shown in Fig. 6. The Examiner also cites Col.3, lines 27-38 as disclosing a third halo implant in the method of Cheek. However, this portion of Cheek is also directed to a halo implant method of the conventional art (shown in Fig. 3), rendering the rejection under 35 U.S.C. 102(a) invalid. Besides, this implant step is not described as a third halo implant. Neither is it otherwise shown to be a third halo implant in the disclosure of Cheek.

Since Cheek only discloses the two halo implants shown in Figs. 5 and 6 respectively (each performed only once), Cheek fails to teach performing a first halo implant process twice on the first region of the semiconductor substrate by using a tilt angle of about 45° and twist angles of 0° and 180°, as recited in independent claim 1 (as amended) or performing a third halo implant process on the first conductive type MOS region, by using a tilt angle of about 0°, as recited in independent claim 8 (as amended).

Claim 2 and claims 4-14 depend, either directly or indirectly on independent claims 1 and 8, and therefore are patentable at least for the reasons stated with respect to independent claims 1 and 8. Reconsideration and withdrawal of this art grounds of rejection are respectfully requested.

CONCLUSION

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider all presently outstanding rejections and that they be withdrawn. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone Percy L. Square, Registration No.51,084, at (703) 205-8034, in the Washington, D.C. area. Prompt and favorable consideration of this Amendment is respectfully requested.

Attached hereto is a marked-up version of the changes made to the application by this Amendment.


If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By: 

Joseph A. Kolasch
Reg. No.: 22,463


JAK/PLS/asc

P.O. Box 747
Falls Church, Virginia 22040-0747
Telephone: (703) 205-8000

(703) 205-8000

Attachment: Version with Markings to Show Changes Made

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

The claims have been amended as follows:

1. (Twice Amended) A method for forming a junction in a semiconductor device [with symmetrical halo implants], comprising the steps of:

forming a photoresist film pattern on a semiconductor substrate excluding a first region;

[forming symmetrical first and second implants by] performing a first halo implant process ~~twice~~ [and a second halo implant process] on the first region of the semiconductor substrate by using a tilt angle of about 45° and twist angles of 0° and 180° [corresponding to the first halo implant and second halo implant, respectively]; and

performing a ~~second~~ [third] halo implant process on the first region of the semiconductor substrate by using a tilt angle of about 0°.

2. (Twice Amended) The method according to claim 1, wherein [both] the first halo implant process [and second halo implant process are performed] is performed with an energy of 20KeV and a dose of 4.0×10^{12} ions/cm².

4. (Twice Amended) The method according to claim 1, wherein the ~~second~~ [third] halo implant process is performed only once at a tilt angle of about 0°.

5. (Twice Amended) The method according to claim 1, wherein the ~~second~~ [third] halo implant process is performed with an energy of 16KeV and a dose of 4×10^{12} ~~unit~~ unit

8. (Twice Amended) A method for forming a junction [with symmetrical halo implants] in a semiconductor device, comprising the steps of:

providing a semiconductor substrate divided into a first conductive type MOS region and a second conductive type MOS region;

forming a photoresist film pattern on the second conductive type MOS region;

[forming symmetrical first and second halo implants by] performing first and second halo implant processes on the first conductive type MOS region at about a 45° tilt angle and at twist angles of about 0° and 180°, respectively; and

performing a third halo implant process on the first conductive type MOS region, by using a tilt angle of about 0°.